GE Fanuc Automation

Industrial Computers

Model 2050 Industrial Computer

Hardware User's Manual

GFK-1737A *November 2000*

Warnings, Cautions, and Notes as Used in this Publication

Warning

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where equipment might be damaged if care is not taken.

Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

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CIMSTAR	Modelmaster	Series 90	VersaPro
Field Control	Motion Mate	Series Five	VuMaster
GEnet	ProLoop	Series One	Workmaster

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Content of This Manual

This manual describes the features and operation of the following Model 2050 industrial computer products:

15.0" Industrial computer with Windows NT

15.0" Industrial computer with demo version of CIMPLICITY HMI software

Related Publications

GFK-1189	*CIMPLICITY® HMI for Windows NT™ Important Product Information*
GFK-1180	*CIMPLICITY® HMI for Windows NT™/CIMPLICITY Server for Windows NT™ Base System User Manual*
GFK-1181	*CIMPLICITY® HMI for Windows NT™/CIMPLICITY Server for Windows NT™ Device Communications Manual*
GFK-1396	*CIMPLICITY® HMI for Windows NT /CimEdit Operation Manual*
GFK-1422	*Open Factory CNC Systems User Manual*
GFK-1716	*Development Tools Getting Started Guide for ControlStation NT, ControlStation CE and ViewStation CE*

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Chapter 1

Model 2050 Industrial Computer Features

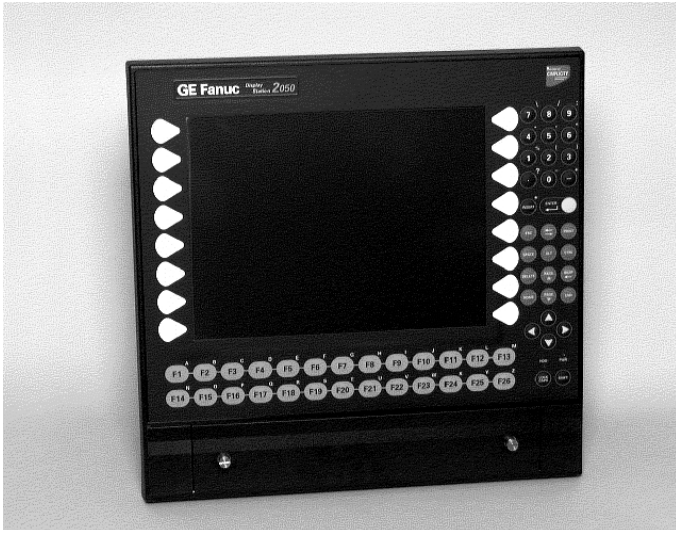
The Model 2050 industrial computer is a high performance workstation designed primarily for use as a hardware platform for Human Machine Interface (HMI) and/or Supervisory Control and Data Acquisition (SCADA) software packages running on Windows NT® operating systems.

Each member of the 2050 industrial computer family is a fully self contained PC-compatible computer with a built-in flat screen display and resistive touch screen. The unit is housed in a rugged metal case to protect the system against dust, water, and damage.

Model 2050 industrial computers are available with auto ranging main power input unit for 110 or 220 VAC operation.

The unit is supplied completely assembled and requires only mounting and connecting. The use of special clips to secure the unit to the panel eliminates the need for mounting holes and requires only one cut-out to mount the unit.

Before powering up your system for the first time, you should refer to the procedures in Chapter 2, which contain information you need to set up the operating system and network communications.



Feature Summary

When you purchase a Model 2050, you receive:

- Industrial computer with the operating system software installed.
- Installation hardware
- Option to have GE Fanuc's CIMPLICITY or FrameworX software preloaded.
- Ethernet driver floppy disk and manual
- Microsoft Windows documentation, software distribution, Certificate of Authenticity and license agreement
- Power cord
- Image Recovery Disk with instructions.

Standard Features

Feature	Description
Microsoft Windows NT	Standard on all models
CPU	Intel Celeron 366 MHz (minimum)
Cache	128K L2
Expansion slots	Three ISA, one PCI, one shared PCI/ISA
Hard disk	6.4GB (minimum) (Removable)
Floppy disk drive	3.5 inch, 1.44MB (Front Access)
RAM	64MB SDRAM minimum; 128MB Maximum installed by factory. Maximum upgrade: 384MB with registered DIMMs, 768MB with unregistered DIMMs
Display	15.0" Color Active Matrix TFT –XGA 1024 x 768 resolution
Touch Screen	High Resolution Resistive 1024 x 1024
Parallel ports	One front access (LPT1) and one side access (LPT2)
Serial port	Three available, one front access, two side access
USB ports	Two USB, side access
Communications	PCI 10/100 Ethernet (RJ-45) (side access)
Keyboard port	PS/2, Front or side access
Mouse port	PS/2, Front or side access
CD-ROM	32X (minimum) side access
Front Panel Keypads	74 Front panel keys. 26 Function keys. Refer to Chapter 5 for keypad layout.

Optional Features

The following features are optional on all models in the Model 2050 range. Contact your GE Fanuc sales representative for details.

- Additional DRAM (DIMMs) (upgrade units only)
- Higher speed CPU (upgrade units only)

Removable Hard Disk Drive

The Hard Disk Drive can be quickly removed for servicing or substitution.

Caution

The industrial computer must be powered down before removing or installing the Hard Disk Drive.

CD-ROM

The CD-ROM is located on the side access panel.

Front Panel Keypads

The front panel is supplied with 26 Function keys that double as a full alpha keypad. You can enter all 26 alpha characters, selecting lower or upper case via the SHIFT or LOCK CAPS keypads. There is a full numeric keypad with 13 additional alpha characters available with the SHIFT keypad. There are 12 control keys and 4 arrow keys.

Status LEDs

Front panel mounted LEDs indicate Power and Hard Disk Drive (HDD) status. An LED will also indicate when the LOCK CAPS and SHIFT keypads are selected. The floppy drive has its own status indicator.

Front Access Panel

The 2050 is equipped with a front access panel which provides access to one serial port, floppy disk, printer port, keyboard, VGA, and PS/2 mouse connectors. The keyboard and PS/2 mouse connections are also available on the side access panel.

Standard I/O

The Model 2050 industrial computer provides the following I/O interface channels:

- Four RS-232 serial ports. COM1 and COM3 are accessible on the side and COM4 is located behind the front panel door. The COM2 serial port is connected internally to the touch screen and is not available to the user.
- Two enhanced parallel ports. LPT1 is located behind the front panel door and LPT2 is located on the side.

If the end application requires serial or parallel interfaces in addition to those provided by the standard system, these can be provided by the addition of specific ISA I/O cards. A wide selection is available from third party sources to provide user flexibility.

Expansion Slots

The Model 2050 industrial computer provides multiple expansion slots.

- Three ISA slots
- One PCI slot
- One shared expansion slot for either PCI or ISA

All the expansion slots within the system use the standard PC card clamping system.

Warning

Turn off power to the industrial computer and disconnect the power supply before installing or removing any control card or communications cable. To disconnect the unit from the main power, remove the power cord.

Network Interface

The Model 2050 includes an autosensing 10/100 Ethernet adapter that provides a RJ-45 connector for unshielded twisted pair cable.

Application Software

Model 2050 industrial computers can be preloaded with CIMPLICITY HMI or FrameworX software.

Chapter 2 Powerup and Software Installation

This chapter contains information you need to set up your Model 2050 industrial computer's operating system and network communications.

Setup

Before you attempt to power up the system for the first time, inspect the unit for loose or damaged components. Remove the back cover and make sure there are no loose or damaged assemblies. Applying power to a system with damaged components may cause additional damage.

Before you power up your system, you may want to attach a standard PS/2-type keyboard and mouse to the external ports on the industrial computer. Most configuration activities that you perform on the unit can be more easily completed using a keyboard and mouse.

Powering Up the Model 2050 Industrial Computer

Caution

Do not connect or disconnect external devices, such as a printer, keyboard or a mouse while the unit is powered on. Failure to observe this precaution could result in damage to the equipment.

The power switch is located on the side of the industrial computer, next to the input power connector. To power up the unit, set the rocker switch to the ON position.

During power up, the processor will run its normal diagnostic checks and indicate the presence of any errors either with a screen prompt or with warning beeps.

System Startup

Before you get started, you need a PS/2 keyboard. A PS/2 mouse is recommended to help navigate through the setup screens.

1. Plug in the keyboard, PS/2 mouse (if available), and power cord.
2. Power on the unit.
3. Read license agreement
4. TAB to your choice and press ENTER.
5. Press ENTER to start the Windows NT Setup.
6. Type your name
7. Press the TAB key and type your company name.
8. Press ENTER.
9. Enter your Windows NT Authentication number found on your Windows NT manual. You will need to use the TAB key to get to each number field. If correct, press ENTER.

Note

Computer names must be less than or equal to ten characters to run CIMPLICITY HMI software. Each computer on a network must have a unique name.

10. Enter a Computer name. This name should be unique to other computers on the same network. Press ENTER.

Note

Your system has been set up to enable auto logon. Auto logon allows the system to boot into Windows NT without your having to use a keyboard to press CTL-ALT-DEL.

11. You will be prompted for a password.
    - To use the auto logon feature, type **admin** for the password. Press the TAB key and type **admin** in the Confirm Password box. Press ENTER.
    - To skip the password, press ENTER
    - To assign a password, type in a password, press the TAB key, and type the password in the Confirm Password box. Press ENTER.
12. Press ENTER to continue with Windows NT Setup.

Note

The factory setting for the IP is 111.111.111.111 and for the Subnet is 255.0.0.0. If necessary, consult your network engineer to select appropriate addresses.

13. After completing the network setup, the system will copy files over and finalize its setup.
14. At the end of the setup process, you will be asked to reboot the system. Press ENTER.

Login Recommendation

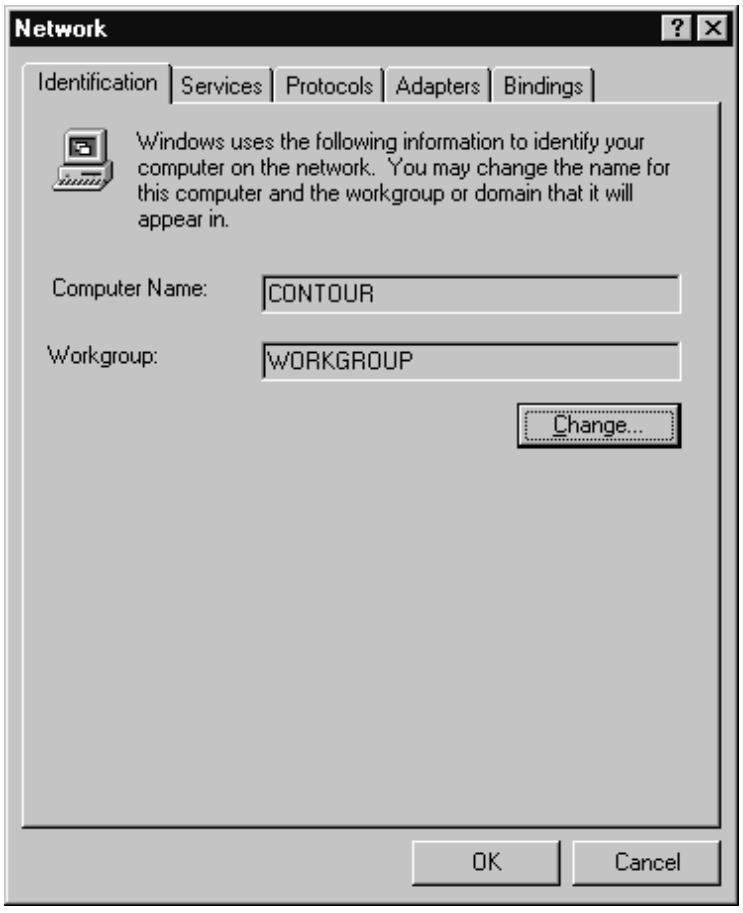
If you type **admin** as your Administrator password, your industrial computer will automatically log on as Administrator.

Log onto the system as Administrator when you power up the system. Doing so eliminates the requirement to log on to CIMPLICITY when you run the CIMPLICITY Demo or any other CIMPLICITY project that includes a user named Administrator. All CIMPLICITY projects are configured with an Administrator user by default.

Configuring the Industrial Computer to Run on a Microsoft Network

Before configuring your new Display Station for a network, you should consult your network administrator. Duplicate TCP/IP addresses and duplicate computer names on the same network can cause network problems.

1. Click the Start Icon, then click Settings, and Control Panel.
2. In the Control panel window, double click the Network icon. The Network dialog box appears.



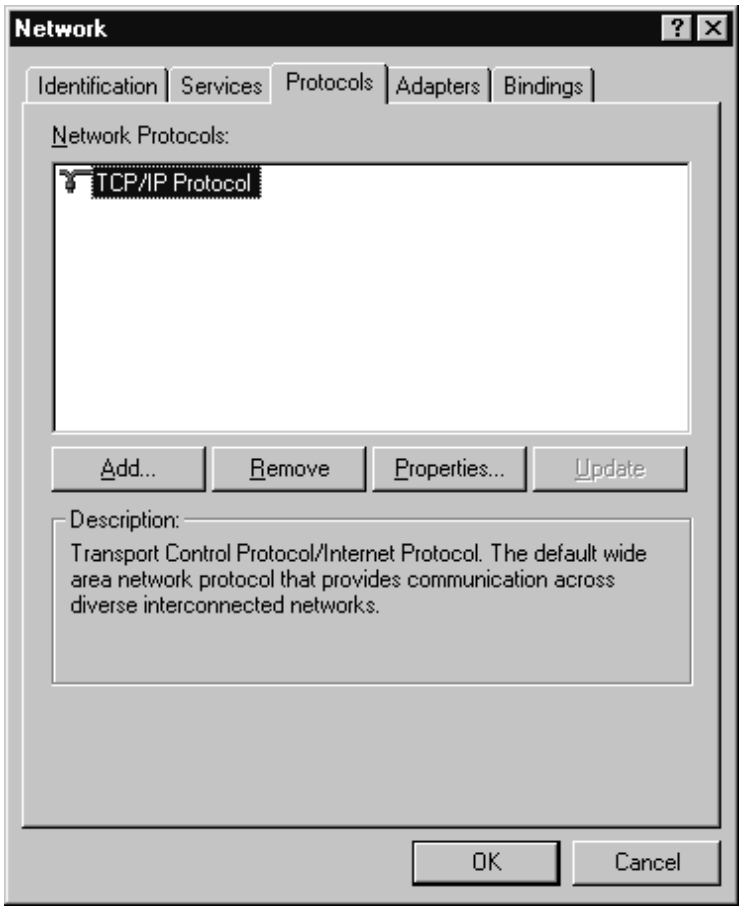
3. On the Identification tab, click Change. You will need to verify your Computer Name (entered at machine startup) and Workgroup name.

Note

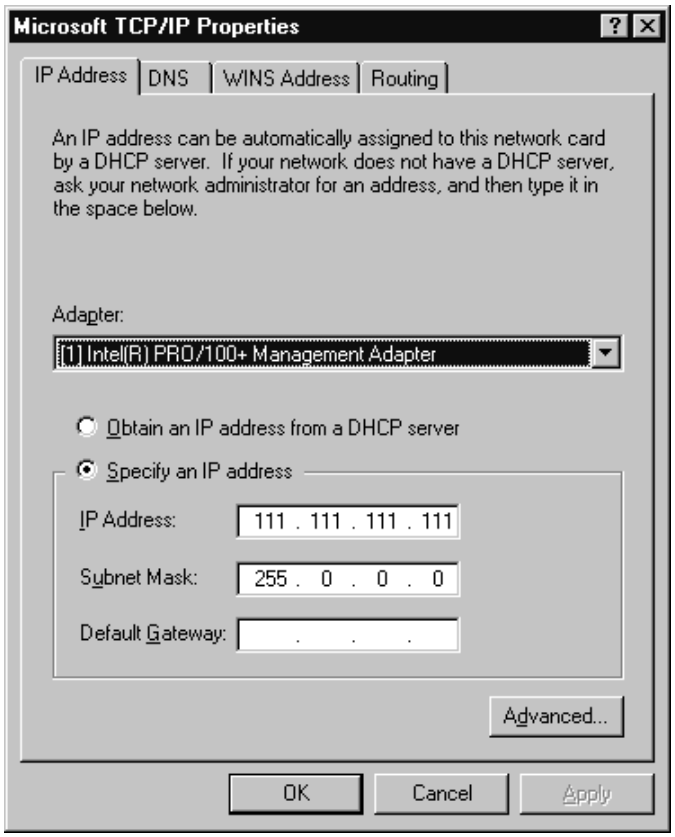
Computer names must be less than or equal to ten characters to run CIMPLICITY software. Each computer on a network must have a unique name.

4. To modify the TCP/IP properties,

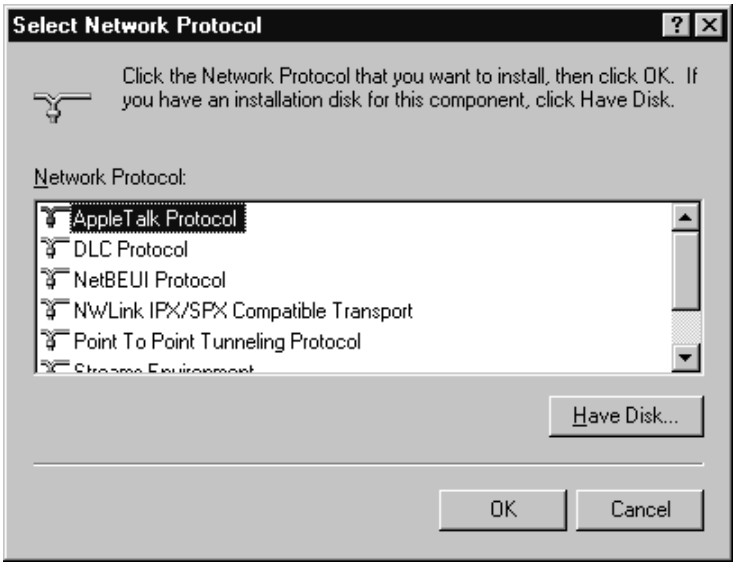
   A. Go to the Protocols Tab, highlight TCP/IP protocol, and click Properties.



   B. In the Microsoft TCP/IP Properties, change the Address from 111.111.111.111 to a unique address and change the subnet mask from 255.0.0.0 to your subnet mask. If your network's IP addresses are controlled by a DHCP server, change the setting from Specify an IP address to Obtain an IP address from a DHCP Server.


Microsoft TCP/IP Properties
IP Address
DNS
WINS Address
Routing
An IP address can be automatically assigned to this network card by a DHCP server. If your network does not have a DHCP server, ask your network administrator for an address, and then type it in the space below.
Adapter:
(1) Intel(R) PRO/100+ Management Adapter
Obtain an IP address from a DHCP server
Specify an IP address
IP Address:
111 . 111 . 111 . 111
Subnet Mask:
255 . 0 . 0 . 0
Default Gateway:
Advanced...
OK
Cancel
Apply

5. To add other protocols such as NetBEUI, on the Protocols tab of the Network dialog box, click Add. A list of available protocols will appear. Choose the protocol you wish to install and click OK. The system may ask where the Windows NT Setup files are located. They are in the C:\I386\ directory.

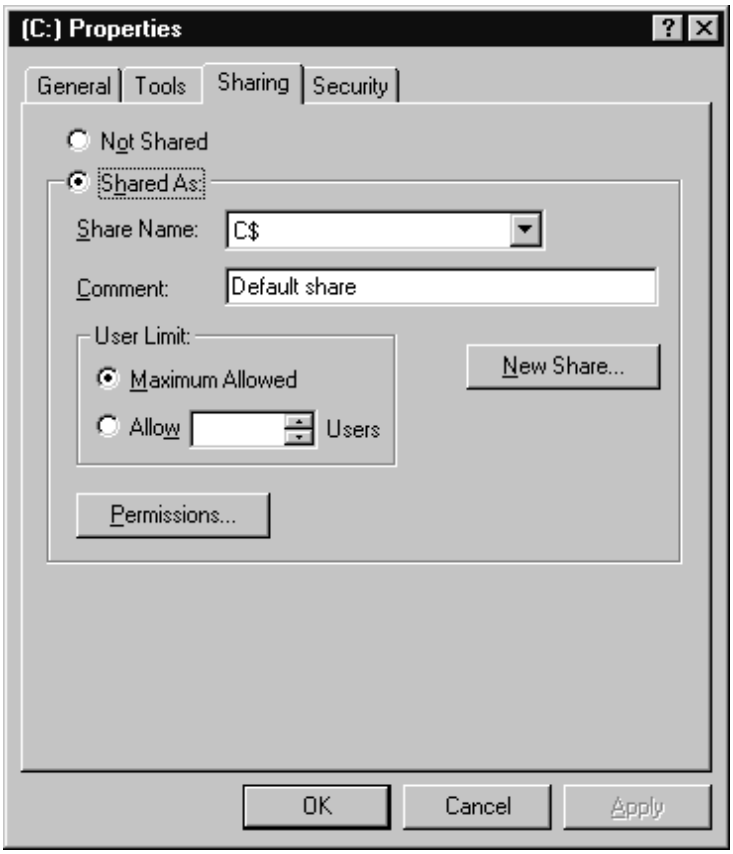

Select Network Protocol
Click the Network Protocol that you want to install, then click OK. If you have an installation disk for this component, click Have Disk.
Network Protocol:
AppleTalk Protocol
DLC Protocol
NetBEUI Protocol
NWLink IPX/SPX Compatible Transport
Point To Point Tunneling Protocol
Have Disk...
OK
Cancel

Note

It is recommended that after the system accesses the original Windows NT install files, the Windows NT Service Pack be reinstalled to update any files that were added or overwritten.

6. When you have finished setting up the Network, click OK in the Network dialog box. Click Yes to reboot your system now.

7. The network shares for the system have been left at their default administrative settings. To modify them, double click My Computer on the desktop, highlight C:, and view the drive's properties by clicking File, Properties. Select the Sharing tab.



Installing Application Software

The Windows operating system and GE Fanuc software (except IC850PCT400) are loaded onto the industrial computer at manufacture. If it is necessary to reload software, follow the instructions in the documentation supplied with the software.

Directory Structure

The contents of the industrial computer hard drive, as shipped from GE Fanuc are listed below.

`C:\i386`	**Windows NT CD**
`C:\i386\$OEM$\Drivers\SC3`	**Touch screen drivers**
`C:\i386\$OEM$\Drivers\Realtek`	**Network drivers**
`C:\SP4`	**Service pack 4 drivers**

Note

If you reload any Windows NT component requiring files, such as a network driver, you must reload service pack 4. To do this, type:

```
C:\SP4\SP4i386.exe
```

Reloading Windows NT on the Hard Disk From CD

To reload Windows NT you should follow the instructions in the Windows NT manual from Microsoft Corporation. After completing the installation, the BOOT.INI file must be modified to ensure that the touch screen works correctly.

- Edit the BOOT.INI file and add the /NoSerialMice:COM2 option to the end of each entry in the [operating systems] section of BOOT.INI.
- If you have concerns about performing this step call the GE Fanuc hotline for assistance.

Image Recovery

The following procedure provides instruction on how to use the *Field Image Recovery Disk* (44A749863-G01Rxx). This disk will enable you to recover all software on your computer as received initially from GE Fanuc.

Warning

Before attempting an Image Recovery on your unit, make sure to record all critical settings and conduct a full back up of all software projects and critical documents. You will also need to have your software (CIMPLICITY, FrameworX) registration and Microsoft Authorization Numbers handy. *This process will clear all contents from your Hard Drive and return your system to the factory configuration.*

Instructions for Image Recovery

1. Prior to Image Recovery, a standard PS/2-type keyboard will need to be connected to the external keyboard port.
2. Insert the *Field Image Recovery Disk* into the Floppy Drive
3. After inserting the Recovery Disk, the system will prompt you to restore the image. Select **<1>** to "RESTORE SYSTEM TO ORIGINAL CONDITION". If you have initiated this process in error, press **<2>** and Exit the Recovery program.
4. Select **<1>** again to "PROCEED WITH SOFTWARE RESTORE". Choose **<2>** to cancel Recovery and exit to MS-DOS®®.
5. At this point the factory image will be recovered from a hidden partition on the Hard Drive. This will take approximately 12 minutes. When prompted, reboot your system.
6. After rebooting your unit, the system will bring you to the initial startup screens as received from the factory.

If you have questions about this procedure, please contact 1-800 GE FANUC.

Shutting Down the Computer

Caution

To avoid damaging files, always shut down Windows software before removing power from your Model 2050.

To shut down Windows NT software, select Shut Down from the Start menu.

® MS-DOS is a registered trademark of Microsoft Corporation.

Chapter 3 Hardware Installation

This chapter describes the procedures for the safe location and securing of the Model 2050 industrial computer. The Model 2050 industrial computers have been designed to ensure simple installation of the system.

A single cut-out in the mounting panel is all that is required when mounting the industrial computer. No extra mounting holes are needed. Instead, 12 clips are supplied and are used to secure the unit from behind the mounting panel.

This chapter also describes how to install ISA and PCI cards and how to change the air filter.

Installation Guidelines

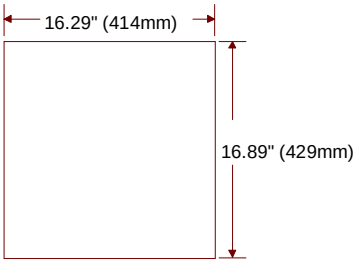
- In an industrial environment, the panel into which the unit is mounted should provide protection from dust, dirt and water.
- The panel should be capable of supporting the weight of the industrial computer without distortion to the panel. The mounting clips will support a panel thickness of up to 5mm (0.2 inch).
- All 12 of the mounting clips must be fitted properly to achieve a good seal between the industrial computer and the panel to which it is mounted.
- Inlets and outlets must have at least 25mm of space around them and not be obstructed.

  Adequate airflow around the exterior of the unit is important to the interior temperature of the unit. Fans are used to create air flow through the industrial computer ensuring that a correct working temperature is maintained. One of the fans is located on top of the CPU chip and is used to cool the processor. Another fan is built into the power supply housing and blows air out of the unit. Another fan is located above the CD-ROM and blows air out of the cabinet.

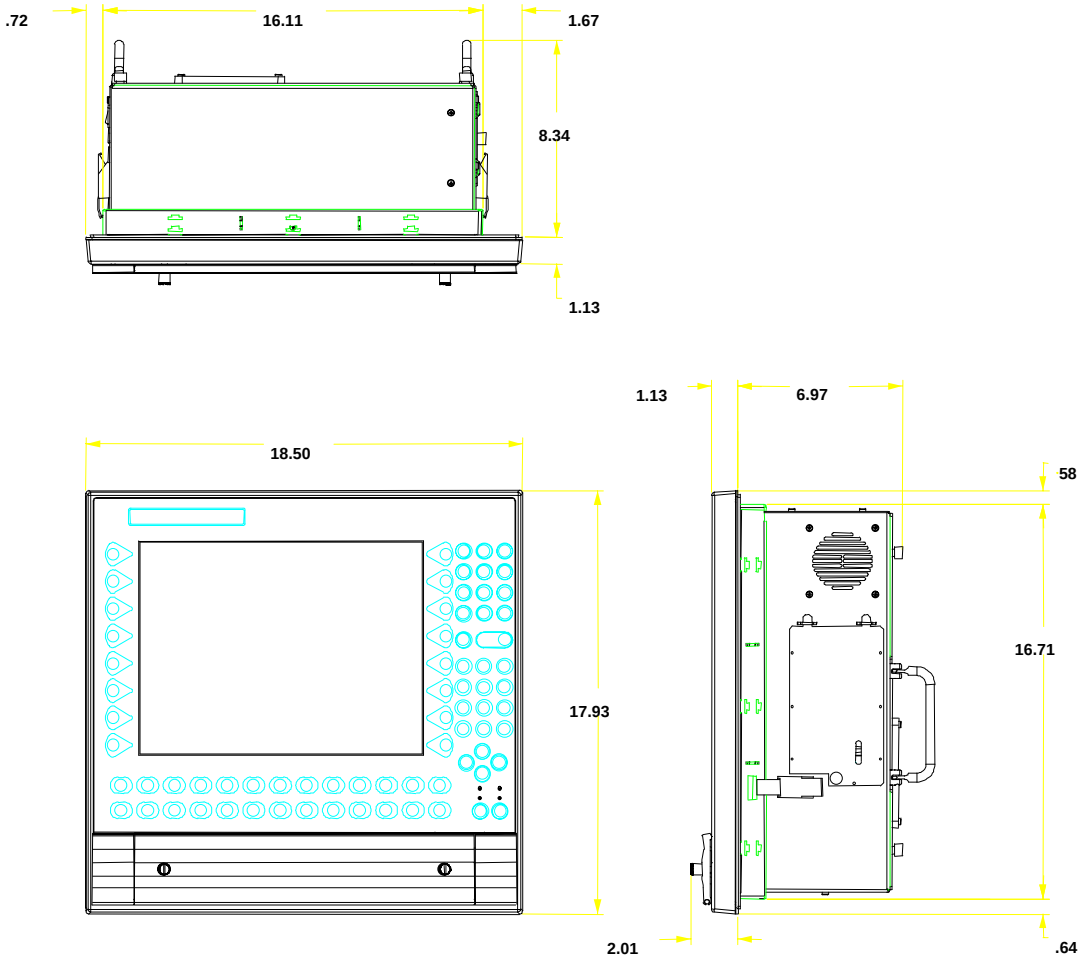
  Incoming air passes through a filter, located on the rear cover, that removes dust and dirt. The filter should be checked and replaced regularly. For details, see page 3-8

Panel Cutout

Cut an opening in the panel to the dimensions shown. The cut-out dimensions of 16.29" (414mm) x 16.89" (429mm) allow a 1.2mm clearance on each edge of the industrial computer front assembly. The unit requires a minimum of 178mm (7") depth when mounted.

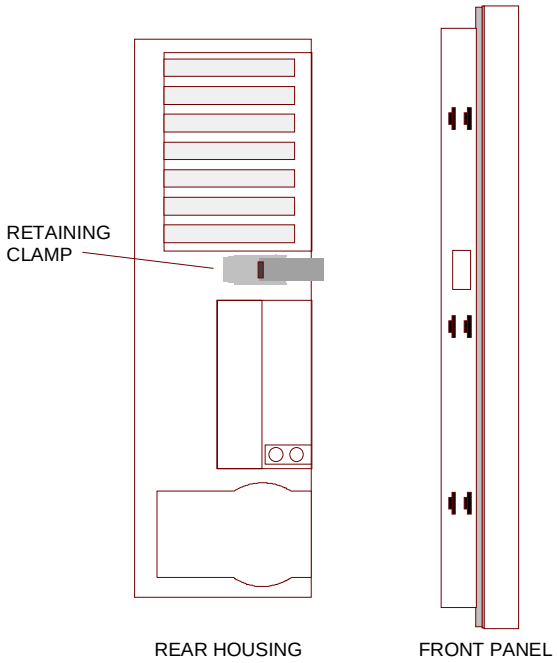


Dimensions



Field Removable Rear Housing

The Model 2050 industrial computer is equipped with a field removable rear housing to allow the customer to remove and completely separate the CPU from the Front Panel for installation or maintenance needs



Removing the Rear Housing

Caution

Power down the industrial computer and remove the power cord from the power source before removing or installing the rear housing.

A retaining clamp on each side of the rear housing secures the rear housing to the front panel. The retaining clamps are prevented from accidental opening by a locking clip located in the middle of the clamp.

1. Press the locking clip (small black button in the middle of the clamp) toward the front panel then lift the retaining clamp handle.
2. Unlatch the now loosened retaining clamps from the front housing.
3. Pull the rear housing apart from the front housing by pulling straight back on the rear housing.

Installing the Rear Housing

1. Line up the rear housing with the front of the industrial computer.
2. Insert the rear housing into the front of the Display.

Warning

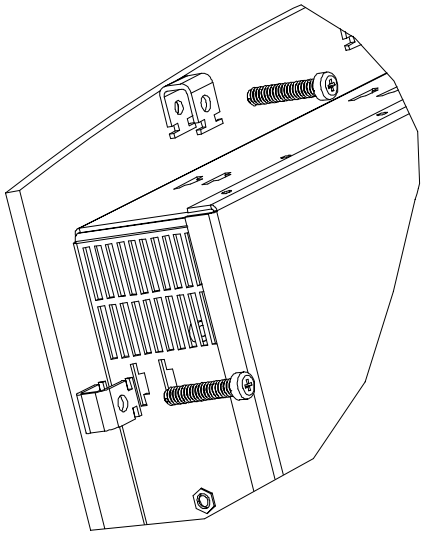
Failure to line up rear housing with front of industrial computer correctly may cause misalignment of the display with the front housing or, in extreme cases, damage to the touch screen during reattachment.

3. Fasten the retaining clamps of the rear housing to the corresponding slots in the front of the industrial computer.
4. Pull the clamps back towards the rear of the unit, securing the rear housing to the front of the industrial computer.

Panel Mounting Clips

To install the Front Panel in the panel cutout, remove the Front Panel as described in "Removing the Rear Housing."

Position the Front Panel in the cut-out and fit the 12 retaining clips into the slots on the industrial computer. All clips must be used to produce a good seal.



1. Screw in the tightening screws on each clip so that the clip is held snug. To ensure a good seal between the computer front panel and the mounting panel, the clips must be tightened evenly. (Tighten each of the clips in turn, a little at a time.)
2. Attach the CPU Module to the front panel by following the instructions under “Installing the Rear Housing.”

Installing Expansion Cards

The Model 2050 industrial computer provides multiple expansion slots.

- 3 full-length ISA slots
- 1 PCI slot
- 1 Shared ISA/PCI slot

If your card is a Legacy ISA type, follow the instructions on page 3-7, then proceed with installation.

All the expansion slots within the system allow the card to be clamped into place using standard PC card clamping.

The rear cover of the industrial computer must be removed in order to access the ISA and PCI bus cards. Four thumb screws are used to secure the rear panel cover to the unit.

When the thumb screws are loosened, the back plate will slide upwards and can then be lifted clear of the main unit.

Warning

To avoid a risk of electric shock, turn off power to the industrial computer and disconnect the main power before removing the rear cover from the unit.

Caution

To avoid damage from electrostatic discharge, adhere to the following precautions when installing ISA and PCI cards:

- The card is packaged in a static-safe bag that protects the product during shipping. Before removing the card from this bag, be prepared to handle it in a static-safe environment.
- Wear a properly functioning antistatic strap and be sure that you are fully grounded. Never touch the card, or any components inside the computer, unless you are wearing an antistatic strap.
- Any surface upon which you place the unprotected card should be static-safe, facilitated by antistatic mats, if possible.
- Extra caution should be taken in cold, dry weather, when static charges can easily build up.

Blanking Plates

Blanking plates are fitted to each unused card position. These blanking plates can be removed as necessary in order to install new cards. Any empty slots must have a blanking plate fitted, otherwise agency approvals become invalid.

Configuring Expansion Cards (Legacy ISA Only)

Caution

For most applications an IRQ or address cannot be shared by more than one resource. If more than one resource is set to the same interrupt or address, the application may not respond properly and could cause your machine to lock up. Following these instructions when installing Legacy ISA cards will prevent problems with resource conflicts.

Legacy ISA cards are the oldest standard and require memory, I/O, and IRQ settings to be manually set on the card using jumpers, DIP switches, or a configuration program. The card and system need to have the same hardware settings.

1. Connect a keyboard, turn on the system power, and press F2 when prompted to enter the BIOS Setup program.
2. Select Advanced, then PCI Configuration, and PCS/PNP ISA Resource Exclusion.
3. If the card requires one or more interrupts, go to an IRQ that currently reads "Available" and change it to "Reserved" by pressing +/-. Do ***not*** use an IRQ that already reads "Reserved."
4. If the card requires memory space, press the arrow key to return to the PCI Configuration screen. Select PCI/PNP ISA UMB Region Exclusion. Go to a memory block that currently reads "Available" and change it to "Reserved" by pressing +/-. Do ***not*** use a memory block that already reads "Reserved."
5. Press ESC to exit the configuration screen. In the Exit menu, select Exit Saving Changesand to save and exit Setup. When the screen goes blank, turn off the power.
6. If the card has jumpers or DIP switches, set them so that they match the IRQ and memory addresses set in the BIOS Setup.
7. Set the I/O port settings of the card (if any) so that they fall within the ranges labeled "Available" in the following table.
8. If the card is set up using a configuration program, proceed with installation, then run the card's configuration program. Set the IRQ and memory address settings to be the same as those put into BIOS Setup. Set the I/O port settings (if any) to a range labeled "Available" in the following table.

I/O Port Range Table

000-1FF	Reserved
200-277	Available
278-2FF	Reserved
300-377	Available
378-3DF	Reserved
3E0-3EF	Reserved
3F0-3FF	Reserved

Changing the Air Filter Element

The filter element should be cleaned or changed every three months, or sooner in dusty environments. If the air filter is not changed at suitable intervals, or if a non approved filter is used, the unit may overheat. For details of approved filter elements, refer to "Ordering Information" in Appendix A.

The filter element is located on the outside of the rear cover of the industrial computer.

Warning

To avoid a risk of electric shock, turn off power to the industrial computer and disconnect the power supply before removing the air filter cover from the unit. To disconnect the unit from the power supply, remove the power cord.

Caution

Power down the industrial computer before replacing the air filter to prevent accidental ingestion of foreign material.

1. To avoid a risk of electric shock and to prevent environmental contaminants from entering the unit, power down the unit prior to removing the filter.
2. Carefully snap off the plastic cover of the air filter from the back cover of the industrial computer.
3. Clean or replace the old filter.
4. Snap the cover back onto the back plate of the industrial computer.

Chapter 4 Connectors

This chapter describes the connector layout on the standard Model 2050 industrial computer. All power and communication connectors are described in this section.

Communication connectors are provided from the main CPU motherboard. Some of the CPU motherboard connectors are available under the Access Panel on the Front Panel as well as the side panel.

- Keyboard (front or side access)
- PS/2 mouse port (front or side access)
- Three serial ports, COM1 and COM3 (side access), COM4 (front access). (COM2 is connected internally to the touchscreen.)
- Parallel ports, LPT1 (front access), LPT2 (side access)
- Two USB ports (side access)
- Ethernet 10/100 base T (RJ-45) (side access)
- DB15 VGA for CRT video

For details about connectors on proprietary cards you have installed in your industrial computer, refer to the manufacturer's documentation provided with your card.

Power Input

Model 2050 industrial computers are powered by an internal, auto-ranging AC power supply unit that accepts 85 to 135 and 180 to 250 VAC input ranges. The power supply unit also provides a standard IEC outlet socket that supplies 115V at 2A or 230V at 1A.

The power supply input to the industrial computer uses a standard IEC cable, which is provided with the unit. The power supply unit houses an integral ventilation fan that provides cooling for the power supply.

For power supply details, refer to specifications in Appendix A. There are no user-serviceable fuses.

Warning

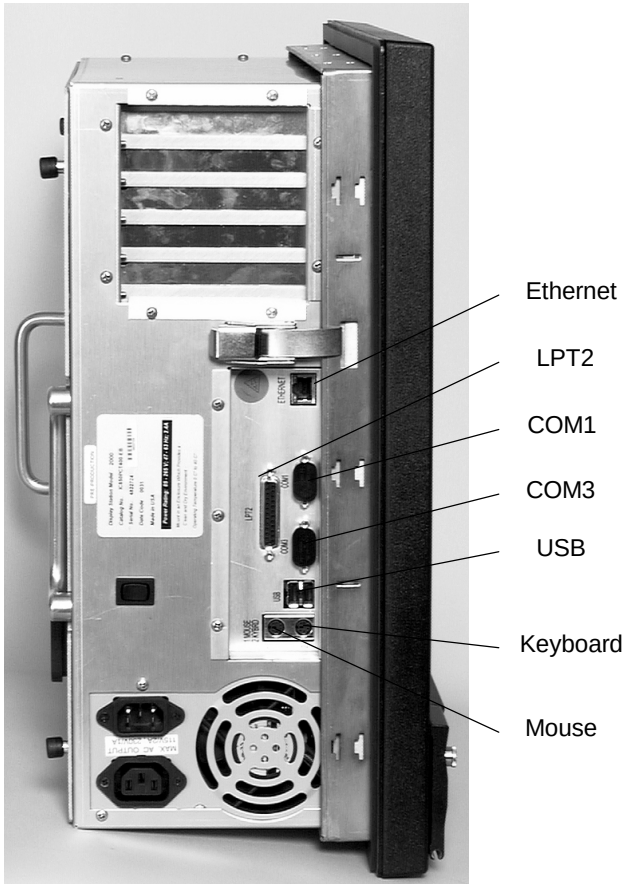
For all equipment that is connected to a power outlet, the socket outlet shall be installed near the equipment and shall be easily accessible.

Connector Layout

Caution

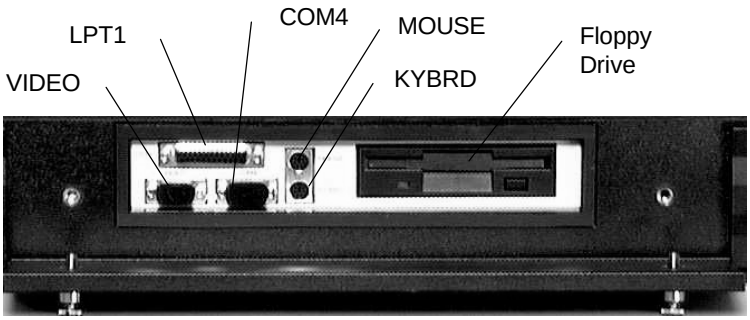
External devices (printer, external disk drive etc.) should not be powered up when connecting to communication ports.

Side Panel Connectors



Front Access Panel Connectors

The front access panel is held secure by two thumbscrews. Loosen the screws and the panel will swing down to reveal the I/O connections and floppy disk drive.

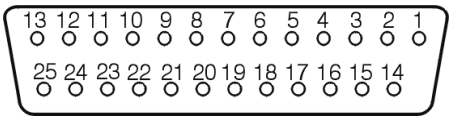


Video Port

A video port is provided behind the front access panel to connect to an external monitor for diagnostics purposes.

Printer Ports LPT1 and LPT2

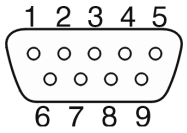
A 25-pin D-type female printer port connector is available under the front access panel (LPT1) and the side panel (LPT2).



Pin	Assignment	Pin	Assignment
1	Strobe	10	Acknowledge
2	Data Bit 0	11	Busy
3	Data Bit 1	12	Paper End
4	Data Bit 2	13	Select Out
5	Data Bit 3	14	Auto Feed XT
6	Data Bit 4	15	Error
7	Data Bit 5	16	Initialize Printer
8	Data Bit 6	17	Select In (from Printer)
9	Data Bit 7	18 to 25	Ground

Serial Communication Ports

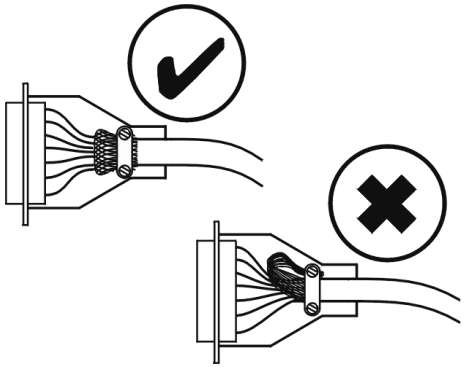
The COM1and COM3 serial ports are available on the side panel. The COM4 serial port is available behind the front access panel. The COM2 serial port is used by the touchscreen and is not accessible to the user. The standard 9-pin D-sub connector pin out is shown below.



RS-232C Name	Pin	Assignment
CF	1	DCD (Data Carrier Detect)
BB	2	RX (Receive Data)
BA	3	TX (Transmit Data)
CD	4	DTR (Data Terminal Ready)
AB	5	GND (Signal Ground)
CC	6	DSR (Data Set Ready)
CA	7	RTS (Request to Send)
CB	8	CTS (Clear to Send)
CE	9	RI (Ring Indicator)

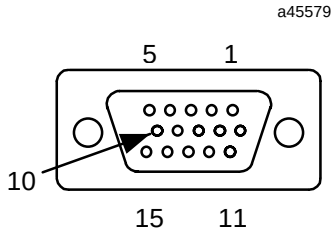
To ensure that the installation meets the EMC radiation specification, the serial cables must comply with the following requirements:

- The cables must be shielded.
- The D type connector covers must provide EMC shielding (e.g. metallized plastic or die cast metal covers).
- The cables must be terminated with 360 degree termination of the shield, as illustrated below.



Video Port

The external VGA display port is a high-density 15-pin, female, D-type connector



Pin No.	Signal Name
1	Red
2	Green
3	Blue
4	no connection
5	Ground
6	Ground
7	Ground
8	Ground
9	+5VDC
10	Ground
11	no connection
12	DDC Data
13	Horizontal Synch
14	Vertical Synch
15	DDC Clock

Chapter 5 System Operation

This chapter provides details of system operation. The following topics are covered:

- System Peripherals
- External Keyboard and Mouse
- Graphic System
- Operator Interfaces
- Communications

System Peripherals

Removable Hard Disk Drive

The Model 2050 industrial computer system has a single removable hard disk drive. The drive is located on the side of the unit next to the CD-ROM. The disk drive has a standard EIDE/ATA-2 interface. The standard size is 6.4GB or larger.

To gain access to the CD-ROM and removable disk drives, remove the cover plate.

To remove the disk drive,

1. Shut down the operating system and remove power from the computer.
2. Press and turn the locking key ¼ turn. The locking key cannot be removed from the drive assembly.
3. Using the handle on the drive, pull the drive out of the enclosure.

CD-ROM Drive

Model 2050 industrial computers include an integral CD-ROM drive which is located next to the removable disk drive under a side access panel. The CD-ROM tray has tabs that hold the CD in the tray while it is in use.

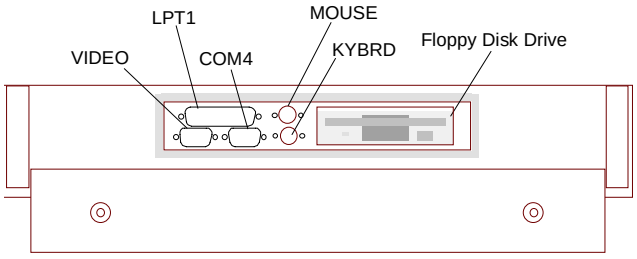
Floppy Disk Drive

Model 2050 industrial computers have a single internal 3.5” 1.44Mb floppy disk drive which is located under the Front Access panel.

The floppy drive is capable of operating in both low density (720KB unformatted) and high density (1.44 MB unformatted) modes.

External Keyboard and Mouse

An external keyboard and mouse (both using PS/2 connectors) can be attached via the connectors under the front access panel.



The touch screen and PS/2 mouse will work simultaneously if the mouse is Microsoft or IBM PS/2 compatible.

Graphic System

The standard Model 2050 industrial computer includes a 15 inch color TFT (XGA resolution) screen. The flat screen display has the following features:

- High Luminance (equal to or greater than 200cd/m2)
- Wide angle viewing
- A built-in back light with a long life back light tube (equal to or greater than 25,000 hrs),

Operator Interfaces

Keypads

The Model 2050 industrial computer incorporates a keypad with 74 front panel keys to provide a wide range of alphanumeric and control functions. Four LEDs provide status indication.

The main keypad returns the same scan codes as a standard PC/AT keyboard, listed in Table 5-1.

- 26 Function keys provide 26 alpha characters when used in the SHIFT mode
- 14 numeric keys with additional alpha keys when used in the SHIFT mode
- 18 control keys including 4 arrow keys
- 4 LEDs to show LOCK CAPS, SHIFT, Power and HDD activity
- 16 operator defined keys

If an external PC/AT keyboard is connected, the integral keypads remain functional.

Membrane Keypad Scan Codes

	Without SHIFT Key		With SHIFT Key		With CAPS LOCK Key	
Keypad	**AT Character**	**Scan Code (Hex)**	**AT Character**	**Scan Code**	**AT Character**	**Scan Code (Hex)**
7	7	0837	\	2B5C	\	2B5C
8	8	0938	/	352F	/	352F
9	9	0A39	:	273A	:	273A
4	4	0534	;	273B	;	273B
5	5	0635	,	332C	,	332C
6	6	0736	"	2822	"	2822
1	1	0231	%	0625	%	0625
2	2	0332	[	1A5B	[	1A5B
3	3	0433	]	1B5D	]	1B5D
0	0	0B30	_	0C5F	_	0C5F
-	-	4A2D	+	4E2B	+	4E2B
. (PERIOD)	. (PERIOD)	342E	?	353F	?	353F
INSERT	Insert	5200	*	372A	*	372A
ENTER	ENTER	1C0D	ENTER	1C0D	ENTER	1C0D
ESCAPE	Escape	011B	Escape	011B	Escape	011B
TAB	Tab	0F09	Shift Tab	0F00	Shift Tab	0F00
PRINT	None	None	None	None	None	None
SPACE	Space	3920	Space	3920	Space	3920
ALT	Left alternate	None	None	None	None	None
CTRL	CTRL	None	None	None	None	None
DELETE	Delete	5300	Delete	5300	Delete	5300
PAGE↑	Pageup	4900	Pageup	4900	Pageup	4900
BKSP	BKSP	0E08	BKSP	0E08	BKSP	0E08
HOME	Home	4700	Home	4700	Home	4700
PAGE↓	Pagedown	5100	Pagedown	5100	Pagedown	5100
END	End	4F00	End	4F00	End	4F00
←	Left arrow	4B00	Left arrow	4B00	Left arrow	4B00
→	Right arrow	4D00	Right arrow	4D00	Right arrow	4D00
↑	Up arrow	4800	Up arrow	4800	Up arrow	4800
↓	Down arrow	5000	Down arrow	5000	Down arrow	5000
LOCK CAPS	LOCK CAPS	None	None	None	None	None
SHIFT (1)	SHIFT (1)	None	None	None	None	None
F1	F1	3B00	a	1E61	A	1EF1
F2	F2	3C00	b	3062	B	3042
F3	F3	3D00	c	2E63	C	2E43
F4	F4	3E00	d	2064	D	2044
F5	F5	3F00	e	1265	E	1245
F6	F6	4000	f	2166	F	2146
F7	F7	4100	g	2267	G	2247
F8	F8	4200	h	2368	H	2348
F9	F9	4300	i	1769	I	1749
F10	F10	4400	J	246A	J	244A
F11	F11	8500	k	256B	K	254B
F12	F12	8600	l	266C	L	264C

Membrane Keypad Scan Codes – Continued

Keypad	Without SHIFT Key		With SHIFT Key		With CAPS LOCK Key	
	AT Character	Scan Code (Hex)	AT Character	Scan Code	AT Character	Scan Code (Hex)
F13	Ctrl Alt F3	6A00	m	326D	M	324D
F14	Ctrl Alt F4	6B00	n	316E	N	314E
F15	Ctrl Alt F5	6C00	o	186F	O	184F
F16	Ctrl Alt F6	6D00	p	1970	P	1950
F17	Ctrl Alt F7	6E00	q	1071	Q	1051
F18	Ctrl Alt F8	6F00	r	1372	R	1352
F19	Ctrl Alt F9	7000	s	1F73	S	1F53
F20	Ctrl Alt F10	7100	t	1474	T	1454
F21	Ctrl Alt F11	8B00	u	1675	U	1655
F22	Ctrl Alt F12	8C00	v	2F76	V	2F56
F23	Left shift F11	8700	w	1177	W	1157
F24	Left shift F12	8800	x	2D78	X	2D58
F25	Ctrl F11	8900	y	1579	Y	1559
F26	Ctrl F12	8A00	z	2C7A	Z	2C5A
L1 (2)	Left shift F1	5400	Left shift F1	5400	Left shift F1	5400
L2	Left shift F2	5500	Left shift F2	5500	Left shift F2	5500
L3	Left shift F3	5600	Left shift F3	5600	Left shift F3	5600
L4	Left shift F4	5700	Left shift F4	5700	Left shift F4	5700
L5	Left shift F5	5800	Left shift F5	5800	Left shift F5	5800
L6	Left shift F6	5900	Left shift F6	5900	Left shift F6	5900
L7	Left shift F7	5A00	Left shift F7	5A00	Left shift F7	5A00
L8	Left shift F8	5B00	Left shift F8	5B00	Left shift F8	5B00
R1 (2)	Ctrl F1	5E00	Ctrl F1	5E00	Ctrl F1	5E00
R2	Ctrl F2	5F00	Ctrl F2	5F00	Ctrl F2	5F00
R3	Ctrl F3	6000	Ctrl F3	6000	Ctrl F3	6000
R4	Ctrl F4	6100	Ctrl F4	6100	Ctrl F4	6100
R5	Ctrl F5	6200	Ctrl F5	6200	Ctrl F5	6200
R6	Ctrl F6	6300	Ctrl F6	6300	Ctrl F6	6300
R7	Ctrl F7	6400	Ctrl F7	6400	Ctrl F7	6400
R8	Ctrl F8	6500	Ctrl F8	6500	Ctrl F8	6500

Table 5-1. Notes:

1. The SHIFT key produces no scan codes on its own, but modifies the scan codes produced by the other keys as indicated in the table above.
2. The white, unmarked soft keys located on both sides of the display are listed as L1-L8 (left side) and R1-R8 (right side) above.

Control and Status Functions

The Model 2050 industrial computer includes a status LED panel, located above the SHIFT keypad. The LEDs have the following functions:

Indicators

LEGEND	Function
PWR	Indicates system power (lighted when power is applied).
HDD	Indicates IDE drive activity when an IDE device is being read from or written to.
LOCK CAPS	Indicates LOCK CAPS is enabled. Disables SHIFT when pressed.
SHIFT	Indicates the SHIFT lock is enabled. Disables LOCK CAPS when pressed.

Touch Screen

The Model 2050 includes a resistive overlay touch screen on the flat panel display.

The touch screen has a resolution of 1024 x 1024 touch points (independent of screen size) and provides an efficient and reliable method of entering information. The screen responds to the touch of your finger with or without a glove.

The touch screen is connected internally to the COM 2 serial port. If you install a card that has settings that conflict with those of the COM 2 serial port, you will need to change the card's configuration.

Touch Screen Driver for Windows

The integral touch screen of the Model 2050 is internally connected to COM2. Parameters must be set within the driver so that they match the hardware settings. The factory default settings are:

COM Port = 2
Address = 2F8 Hex
Interrupt = 3

These parameters are written into the system registry file by the driver setup utility. The driver is installed, configured and calibrated at the time of manufacture.

Communications

Your industrial computer has been configured with networking components that enable you to establish new networks or connect to existing networks easily. If you intend to use Microsoft NetBEUI, TCP/IP, or Direct Cable Connection, some minimal setup changes are required before you can use the system for network applications. In Windows NT systems, these settings are changed using the Network application in the Control Panel program group.

Installed Network Components

Network Component	Comments
PCI Network Adapter	Automatically configured in system
TCP/IP	Default settings must be changed before connecting to an existing network. Contact your network administrator for appropriate settings.
NetBEUI	Default settings must be changed before connecting to an existing network. Contact your network administrator for appropriate settings.
System Identification	Computer Name: Each system is uniquely identified by its serial number and can be renamed before adding it to an existing network Workgroup: The default workgroup is **Workgroup**. This should be renamed before adding it to an existing network.

Caution

The IP Address must be changed to a unique address. If it is not changed, conflicts could occur on your network.

Note

For Windows NT systems: If any component is removed and re-installed, the Service Pack will need to be run after installation. Path is:

C:\SP4\SP4i386.exe

Chapter 6 BIOS Settings

It is normally not necessary to change the hardware configuration settings in the CMOS memory. If settings become corrupted, follow the procedures here to reload the factory configuration.

1. Power down the computer, connect a keyboard and turn on the power. Enter the Setup mode by pressing the F2 key when prompted during the computer power-up sequence. The main BIOS setup utility screen will appear offering several options for changing settings.
2. In the EXIT menu - Load BIOS defaults.
3. In the ADVANCED menu, select Installed OS. Change to “Other.”
4. Arrow to IO Device Configuration. Press ENTER.
5. Make the following menu selections:

USB	Disable
Audio	Disable
COM: A (COM1 on side)	3F8 / IRQ 4
COM: B (COM2, touch screen)	2F8 / IRQ3
COM: C (COM3 on side)	3E8 / IRQ 9
COM: D (COM4 on front)	2E8 / IRQ11
LPT:A (LPT1 on front)	ECP / 378 / IRQ7 / DMA3
LPT:B (LPT2 on side)	ECP / 278 / IRQ5/ DMA0

6. To save your changes, press ESC. In the Exit menu, select Exit Saving Changes.

Chapter 7 Diagnostics and Troubleshooting

This chapter consists of “Self-Test Diagnostics,” “Troubleshooting,” and “Corrective Actions.” “Self-Test Diagnostics,” describes how to respond to errors that could be detected by the automatic self test that is performed each time the Model 2050 industrial computer powers up. “Troubleshooting” contains tables of symptoms, their possible causes, and recommended corrective actions. “Corrective Actions” contains detailed procedures that are too lengthy to include in the Troubleshooting tables.

Self-Test Diagnostics

The computer automatically performs self-test diagnostics each time it is powered up. The self-test consists of a series of checks that verify correct performance of the computer hardware. When the self-test is being performed, you will see the message XXXX KB OK displayed on the screen, where XXXX is a number that increases until it matches the amount of usable memory.

System Test and Initialization

These routines test and initialize board hardware. If the routines encounter an error during the tests, you will see an error message on the screen. There are two kinds of errors: fatal and non-fatal. If a non-fatal error occurs, the system can usually continue the boot up sequence. Non-fatal error messages usually appear on the screen with the following instruction:

```
press <F1> to RESUME
```

Write down the message and press the F1 key to continue the bootup sequence.

System Configuration Verification

These routines check the current system configuration against the values stored in the CMOS memory. If they don’t match, the program will generate an error message. To correct this condition, you will need to run the BIOS setup program and correct the configuration information in memory.

There are three situations in which you might need to change the CMOS settings:

1. You are starting your system for the first time.
2. You have changed the hardware attached to your system.
3. The CMOS memory had lost power and the configuration information has been erased. If this has happened, call GE Fanuc’s Support Hotline at 1-800-GEFANUC (800-433-2682).

Troubleshooting

Powerup

Symptom	Possible Causes	Solution
Computer does not power up.	Power not on (PWR indicator is not lit or display completely dark).	Make sure that computer is plugged in. Make sure that power source is functioning properly.
Display is blank (PWR indicator is lighted).	See "Display" topic in this Chapter	See "Display" topic in this Chapter
`Non-System disk or disk error` message displayed.	Disk in floppy disk drive.	Remove floppy disk and then reboot or cycle power .
`Safe Recovery Error` message displayed.	Occurs on initial power up if the unit is accidentally turned off without first shutting down the Windows software.	The computer will power up normally.
Memory count during powerup self-test is incorrect.	Optional DIMM is installed incorrectly or is incompatible with the Model 2050 industrial computer CPU.	Make sure that the appropriate memory is installed correctly.
`CMOS checksum error – Defaults loaded` **`CMOS battery failed`** message displayed.	CMOS battery failure.	This battery has a lifetime of up to 10 years under normal operating conditions. For more information, see "CMOS Checksum Error" topic in this chapter.
A screen appears just after powerup, or just after reset, which has the title "CMOS Setup Utility."	The F2 key has been accidentally pressed.	Cycle power again. The computer will power up normally.
The computer has reset even though the power was not interrupted.	The CTRL-ALT-DEL keys were pressed twice at the same time.	This should never be done, unless you are attempting to reset the computer.
A:> appears instead of software.	A system floppy disk is inserted.	Remove disk and cycle power.

Display

Symptom	Possible Causes	Solution
Characters are dim.	Computer screen is in direct light.	Change lighting or adjust contrast.
Display is blank (PWR indicator is lit).	Screen temperature is outside operating range.	If computer is in direct sunlight, move it and allow it to cool.
	Computer is set up for invalid video mode.	Reboot. Select VGA Mode
	Screen saver is active.	Touch a key on the keypad.

Memory

Symptom	Possible Causes	Solution
Memory count during powerup self-test is incorrect.	Optional DIMM is installed incorrectly or is incompatible with the Model 2050 industrial computer CPU.	Make sure that the appropriate memory is installed correctly.
`Out of Memory` message is displayed or insufficient memory error occurs during operation.	System ran out of memory for the application.	Check the memory requirements for the application. (Refer to the application documentation.) Install additional memory.
	Too many terminate and stay resident (TSR) programs running.	Modify the startup folder to use only those TSR applications that are really needed.

External PS/2 Mouse

Symptom	Possible Causes	Solution
Cursor does not respond to mouse movement	Mouse not plugged in.	Power down computer. Plug mouse into mouse port on computer and reboot.
	The type of mouse is not supported.	Use a PS/2 mouse.
	System is busy.	Press CTRL-ALT-DELETE to view task list.
	Mouse not detected.	Restart computer with external mouse connected.

Keyboard

Symptom	Possible Causes	Solution
External keyboard locks up	The type of keyboard is not supported.	Use PS/2 compatible keyboard
	Keyboard not plugged into keyboard port on the computer.	Plug keyboard in. (Power down computer first.)
	System is busy.	Press CTRL-ALT-DELETE to view task list.

Communications

PLC/PC Connection

Symptom	Possible Causes	Solution
CIMPLICITY does not communicate with a PLC that has been autoconfigured (AUTOCONFIG/DEFAULT/I/O error).	The system is attempting to communicate with a 90-30 PLC using the SNP driver and a CIMPLICITY project.	1. With the PLC powered up and connected to the Display Station, establish communication between the Display Station and PLC via the 90-30 SNP driver. 2. Using a Hand-Held Programmer, toggle the Default I/O (Enable or Disable) configuration parameter for the CPU. Communications between the computer and the PLC will be stopped. (Communications are stopped when you toggle from Enable to Disable, or vice versa.) 3. Power cycle the PLC.
Communications between the host computer and the controller are unsuccessful.	COM port not configured in system.	Verify that the COM port is configured in the system.
	Cabling between computer and controller.	Verify that the cable between the computer and the controller is correctly wired.
	Baud rate and parity configured incorrectly.	Verify that the baud rate and parity on the computer are consistent with those on the controller.
	Wrong address.	Verify that the slave address is correct.

CNC/PC Communications

Symptom	Possible Causes	Solution
Communications between the host computer and the CNC are unsuccessful.	If an ISA interface HSSB card, the I/O address may be in conflict with other devices	Check PC for conflicting I/O addresses
	HSSB switch setting may be incorrect.	Check that the switch is set to 0, 1 or 2.
	The HSSB driver is not installed	Check Windows NT event log for errors that the HSSB driver (MMCNCD) is not installed
	The HSSB option may not be active in the CNC	Verify that the option and correct CNC Executive Software is installed in the CNC
	The cable connecting the CNC and the PC may not be attached	Verify that the green LED on the HSSB board is on.

Network Communications

Symptom	Possible Causes	Solution
Conflicts on network.	IP Address not unique.	Change the IP address to a unique address. (Contact your system administrator if this or other settings need to be changed.)

Printing

Symptom	Possible Causes	Solution
Printer will not turn on.	Cables not connected properly. Printer power cord not plugged in.	Ensure that the cables are properly connected and that the power cord is connected to the electrical outlet.
Printer will not print.	Printer is not turned on.	Turn on the printer
	Printer is not online.	Set the printer to online.
	The device drivers for your application are not installed.	Install the correct printer drivers for your application in Windows.
	Printer that is set up for a network is not connected to the network.	Connect the printer to the network.
	Printer cable is too long, unshielded, or defective.	Replace the cable.
Printer is offline.	Paper tray is empty.	Fill the paper tray with paper. Set printer to online.
Printer prints garbled information.	Correct printer drivers not installed.	Install the correct printer driver.
	Cable is not connected properly.	Ensure that the printer cable is connected properly to the computer.
	Problem specific to printer.	Run a printer self-test. Refer to the documentation provided with your printer for instructions. If the self-test fails, the problem is printer-specific. The printing section of the software documentation and in Windows online Help may also be helpful.

Corrective Actions

CMOS Checksum Error

If the CMOS battery has failed, the following error messages will be displayed on the screen:

```
CMOS checksum error - Defaults loaded

CMOS battery failed
```

This battery has a lifetime of up to 10 years under normal operating conditions. If the battery failed, contact the GE Fanuc Hotline.

Appendix A Technical Data

Mechanical Specifications

Front Assembly

The Model 2050 industrial computer provides a display screen and a built-in operator keypad and access panel.

Keypad

The keypad on the Model 2050 Industrial computer is manufactured from a chemically resistant polyester. All the keys provide tactile feedback.

Main Chassis

The main chassis is manufactured from aluminum and houses the motherboard which is mounted securely in a vertical plane. Plug in boards are mounted in a horizontal plane perpendicular to the front of the industrial computer.

The housing for the card connectors is recessed so that the card interfaces do not protrude beyond the profile of the main housing.

Rear Cover

The rear cover of the unit is fixed to the main chassis so that EMC emissions are minimized. The cover can be removed easily with finger screws without breaking any electrical connections.

Panel Mounting System

Twelve clamps are provided for mounting the industrial computer to a panel.

Functional Specifications

CPU and Memory	
Microprocessor	Intel Celeron 366MHz minimum*
User Memory	Minimum 64Mbyte*
Operating System	Windows NT
Hard Disk	6.4Gbyte minimum*, IDE standard 3.5 inch mounting
CD-ROM	32x or faster CD-ROM drive
Floppy Drive	Supports 3.5-inch, 1.44Mb PC format floppy disks

PC Backplane	
ISA bus card slots	Three
PCI bus card slots	One
Shared slot	One shared ISA/PCI
Total current available for sharing by up to 3 user cards	+5VDC 1.2 A approx +12VDC 0.1 A approx -12VDC 0.1 A approx

Display	
Display Variants	15 inch Color TFT – XGA
Active Display Area	15 inch - 246 x 184.5 mm

Power Requirements	
AC Input	85 to 265 VAC, 200W autoranging
Power Rating	85 to 265V, 47 to 63Hz; 2.4A
AC Output	115V: 2A 230V: 1A

* Contact your local distributor for upgrades.

Ports	
Parallel Port	LPT1 (front accessible), LPT2 (side accessible)
Serial Ports	COM1 external RS232 port (side accessible) COM2 used by touchscreen COM3 external RS232 port (side accessible) COM4 external RS232 port (front accessible)
Keyboard Port	PS/2 (front or side accessible)
Mouse Port	PS/2 (front or side accessible)

Physical	
Dimensions	
Main Enclosure	412mm wide (16.2 inches) 427mm high (16.9 inches) 176mm deep (6.94 inches)
Front Panel	30mm (1.2inch) deep Extends 14mm (.55 inches) beyond main enclosure on top and bottom, 17mm(.66”) on side and 42mm(1.66”) on other side.
Weight (base unit with no optional cards installed)	15.6Kg (34.3lbs)

Ordering Information

Filter Pads	
Dimensions	118mm x 188mm (4.65 inches x 4.65 inches)
Material	P15/150B
Performance Requirements	Retain 75% by weight of dust particles down to 5-10 microns in size Withstand temperatures to 100° C Provide flame resistance to DIN53438 and BS5588

Note: Filter pads available from:

Globe Motors

http://www.globemotors.com

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